A team of Russian researchers has found, from a study of European noble families, that daughters of older fathers may have shorter life-spans. The team claims its finding reflects the accrual of gene mutations as fathers age--specifically, damage to "housekeeping" genes on the paternally transmitted X chromosome.

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Leonid A. Gavrilov, of the A. N. Belozersky Institute at Moscow State University, and his colleagues looked at data from 700 families, including 2159 daughters and 4942 sons born in the 1800s. To minimize the effect on mortality of infectious diseases, they tallied only children who survived past 30. They found that daughters born to fathers in their 30s lived, on average, to age 74.5. If fathers were in their 50s, daughters' life-spans were about 2 years shorter--72.4. Gavrilov and his colleague and wife, Natalia Gavrilova, say that when the data are controlled for maternal age, parental longevity, and historical fluctuations in life expectancies, the difference is closer to 3 years. There was no significant difference for sons, who died, on average, in their mid-60s.

The Gavrilovs say their research supports the notion that people accrue genetic mutations from cell division as they age, and those can be transmitted to offspring. Mothers don't accumulate mutations in their ova because they are born with all their eggs. But sperm cells, manufactured throughout adulthood, are vulnerable to mutations. Recipients of the paternal Y chromosome (boys) may not be affected by such mutations because the Y doesn't have much on it, says Gavrilov. But only girls get the paternal X.

Richard Suzman of the U.S. National Institute on Aging, where the Gavrilovs have presented their work, calls the study "a really fascinating piece of medical biodemography." Geneticist James Crow of the University of Wisconsin, Madison, says it's consistent with other studies suggesting that children of older fathers are more likely to have inherited disorders. But he thinks the effect found by the Gavrilovs is "surprisingly large" for a single chromosome, as life-shortening mutations "surely" also occur elsewhere in the genome.

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